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THE BUTTERFLIES OF THE EASTERN UNITED STATES AND CANADA.

The Butterflies of the Eastern United States and Canada, with Special Reference to New England. By Samuel H. Scudder. Part I. (Cambridge, Mass., U.S.A.: Published by the Author, 1888.)

THIS is perhaps the most remarkable work on butterflies which has ever been published; and though it has some features which cannot meet with universal approval, it will make a mark in entomological literature which cannot fail to influence future writings. It has, as the author tells us in his prospectus, been twenty years in preparation, of which eight have been entirely given up to it, and embodies thirty-five years of experience in the field, as well as an immense deal of literary research. The result is certainly a work of which, notwithstanding its defects, both the author and his countrymen may well be proud; and considering that it is published at the sole cost and risk of Mr. Scudder himself, who informs me that a sale of 350 copies is necessary before the cost of production can be repaid, it is to be hoped that scientific societies and entomologists in all parts of the world will support his arduous undertaking by subscribing to it. The work is a large quarto, and will be completed in twelve monthly parts, each containing eight plates, coloured and plain, and about 144 pages of text. Of the plates, seventeen are to be devoted to butterflies, six to their eggs, eleven to caterpillars, two to the nests of caterpillars, three to chrysalides, two to parasites, thirty-three to structural details, nineteen will be maps and groups of maps, illustrating the geographical distribution of butterflies, and three are portraits of early American naturalists,—in all, about 2000 figures on ninety-six plates, together with over 1700 pages of letterpress. Considering that both letterpress and plates are of a high character—the chromolithographs by Sinclair and Son, of Philadelphia, being the best I have ever seen, and far superior in detail, fineness, and accuracy to many hand-coloured plates—and that the uncoloured plates are often of microscopical details which require the greatest care and accuracy, I do not think that the price, which is 5 dollars a part, or 50 dollars for the entire work if the whole is paid before January 1, 1889, is too high; though it will certainly place the book beyond the means of many who would wish to possess it. When complete, which will probably be in the course of the next year, the work will only be sold bound in three volumes at 75 dollars, so there is a decided advantage to early subscribers.

From the systematic list at the end of the first volume it appears that the number of species recognized as occurring in New England is about 124, to which 42 not found within these limits will be added in the appendix; so that the amount of space devoted to each species is very much larger than in any other work on butterflies with which I am acquainted. A great deal of the work, however, is taken up with detailed descriptions of the eggs, larvæ, chrysalides, and imagos, which seem to me to be of unnecessary length when accompanied by

so many and such good figures. There are also full analytical tables of the families, genera, and species, based on the characters, not only of the imago, but also on those of the egg, larva, and chrysalis, which is a feature not attempted to anything like the same extent in any previous work; though I am somewhat doubtful whether its practical utility is in proportion to the labour it entails both on author and student. How far these tables will prove useful and correct when applied to species and genera not found in New England, and therefore not examined with the same care by the author, is another question; for it appears to be one of the gravest weaknesses of this work that it attempts to deal in a systematic way—far more minute than any which has hitherto been thought possible—with the species of a very limited fauna; apparently without sufficient consideration of the very much more numerous, and probably more variable, allied species and genera found in other parts of the world.

It has long been known that Mr. Scudder's views on nomenclature are peculiar to himself; and looking on nomenclature, as I do, as merely a means to an end, and of very minor importance provided the same names are used for the same objects by all naturalists, I regret deeply that the utility of such a work as this should be marred to some extent, by the fact that the generic names are in many cases used by no other American or European lepidopterist but Mr. Scudder himself. To such an extent does this peculiarity of nomenclature prevail, that out of seventy-six generic names used for 124 species of butterflies occurring in New England only twenty are in general use; nine or ten more are in partial use; and the remainder are mostly the fancies of Hübner—which have been practically ignored by recent systematists—or the creations of Mr. Scudder himself.

The specific names, however, are happily in most cases the same as those used by Edwards, Strecker, and other lepidopterists; and the English names, of which there is a pretty variety, may be used by those who are amused by them and do not wish to be understood by others.

What is really delightful in this book, and what makes it a monument of industry, care, and patience, is the way in which the life-history, transformations, and habits are worked out; in many cases at a cost of numerous journeys undertaken for this special purpose to remote and difficult parts of the country.

To show the style of the book, we may take the article on "*Eneis*." First we have four pages devoted to the genus *Eneis*, of which two and a half are descriptive of the imago, egg, larva, and chrysalis; but no allusion is made to the species on which this generic description is based, and nothing, unfortunately, is said as to the allied (some of them very nearly allied) species found elsewhere. This is a grave defect, as, however confident Mr. Scudder may be that *Æ. semidea* is peculiar to the United States, it has at least several congeners of fully equal interest in the Arctic region, a sketch of whose distribution could not be out of place, or without interest to his readers, and would certainly be of more value in almost all cases than very wordy non-comparative descriptions, which nine readers out of ten will entirely overlook. Then we have an excursus, of which there are many interspersed through the work, of eight

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pages, giving a charming and life-like account of the White Mountains of New Hampshire and the butterflies found there. This seems to be one of Mr. Scudder's most happy hunting-grounds, and is the only known home, with the exception of the Alps of Colorado, of *Ce. semidea*, the White Mountain butterfly, whose history comes next, and takes up no less than sixteen pages. These include the synonymy and references, which are full and appear accurate; two snatches of poetry (which, by the way, is freely scattered throughout the work); a description of the imago, covering two whole pages of close print; others of the egg, larva, and chrysalis, which take two more; geographical distribution occupies another page. The remainder is devoted to life-history and habits, and ends with a paragraph mentioning the desiderata left to be filled up before our knowledge of the history of the insect is complete.

Not so satisfactory, in my opinion, is the history of *Cercyonis* (*Satyrus*) *alope* and its near congener *nephele*, because, in the first place, not a word is said, in a generic, description extending over three pages, to show how this genus differs (if it does differ) from the genus *Satyrus* or *Hipparchia*, in which the American species are included by other authorities; and, secondly, nothing is said as to whether this generic description is based on the two forms which alone are found in New England, or on the characters of other North American species; which, indeed, are not even named, though their existence is alluded to. As an instance of the difficulty of getting any agreement as to what constitutes a species among butterflies, even when they have been bred as largely, and studied as closely, as this species has been by W. H. Edwards, I may quote Mr. Scudder's remarks:—

"It has been generally conceded of late years that these two types of butterflies were only dimorphic forms of a single species; and I have myself shared in this view, which has been supposed proven by breeding experiments and direct comparisons of a large amount of material made by Edwards, who, far more than all other observers together, has increased our knowledge of the natural history of these butterflies.

"He has instituted comparisons between them at every stage of life; and while he sees differences between caterpillars and chrysalids born of different types, he finds no constant and universal distinctions; while as to the relation of the early stages of the butterflies, he has proved by breeding that 'south of the belt of dimorphism,' as he calls that strip of country where *C. alope* and *C. nephele* both occur, '*alope* produced *alope*,' but inside the belt, *alope* produced intergrades, and *nephele* produced *alope* and also an intergrade. . . . That *nephele*, north of the belt, breeds true, is certain, because the intergrades and *alope* are not found here.

"This would be conclusive if the complete parentage in each case were known; but, as only the mother was known in any case, another explanation is not only possible, but in view of all the facts probable. The intergrades found throughout the belt forming the northern boundary of the typical *alope*, and the southern boundary of the typical *nephele*, seem to be far more easily explainable on the hypothesis of hybridism, since they occur only where such a phenomenon is possible, and wherever it is possible. The same argument applied to the case of *Basilarchia*, as has been done by Edwards, would logically prove more than he would agree to, viz. the specific identity and trimorphism of all the eastern species except *Basilarchia archippus*. That the species of *Cercyonis* here described are certainly distinct, I would by no

means maintain; only that, in view of the facts of distribution, it seems more probable that they should be looked upon as having reached in their development the stage of specific distinction, whilst they are readily fertile *inter se*, and produce intergrades, where they meet on common ground."

It seems to me, however, that there is yet another explanation, which, from what we know of the effect of heat and damp on the variation of butterflies of the same family in India, is even more probable; and that is, that the species is one which, having a wide range of distribution, is affected in the southern part of this range by climatic conditions which do not exist in its northern habitat, and has become modified in consequence, whilst in the central part of its range, the climatic conditions being more variable, the insect is also itself more variable. The most ardent devotee of minute subdivision of species cannot fail to allow, after Mr. de Nicéville's experiments on breeding in Calcutta, that climate can and does produce in the same locality, at different seasons, changes which are far greater than the difference which exists between *alope* and *nephele*, a difference which can be matched in other species of Satyridæ, about the specific identity of which there has hitherto been little or no question.

It does not seem to me logical for Mr. Scudder to treat of these two forms as different species, when he allows the specific identity of such forms as *Cyaniris* (*Lycæna*) *pseudargiolus*, *lucia*, *violacea*, and *neglecta*; this view being based, as it must be, on similar breeding experiments, carried out by the same naturalist, who proved to his own satisfaction and to mine the identity of *alope* and *nephele*.

A marked and novel feature of this work, which I cannot too highly praise, is the separated map of geographical distribution given on Plate 18 for most of the species dealt with in this part. On a small chart of the United States and Canada, the range of each species is coloured in brown, so that one can see at a glance what the distribution is; and though, no doubt, in the less known parts of the country these maps are not strictly exact, yet they give a very fair idea of what would otherwise require much reading to understand.

I look forward with the greatest interest to the succeeding parts, and to the early completion of, this most valuable work, which will take a high place among biological monographs, and will rank like Edwards's "Butterflies of North America," as one of the most important, beautiful, and painstaking books which America has ever produced

H. J. ELWES.

POLE'S LIFE OF SIEMENS.

The Life of Sir William Siemens, F.R.S. D.C.L., LL.D.

By William Pole, F.R.S. (London: John Murray, 1888.)

IS it perhaps to the spirit of this book-making age that we ought to attribute the fact that examples of unsatisfactory biographies have been frequent in recent years? Perhaps works of this kind are too hurriedly compiled, and are laid before the friends and the public at a date too early to allow of such a memorial proving really satisfactory to the one class or to the other.